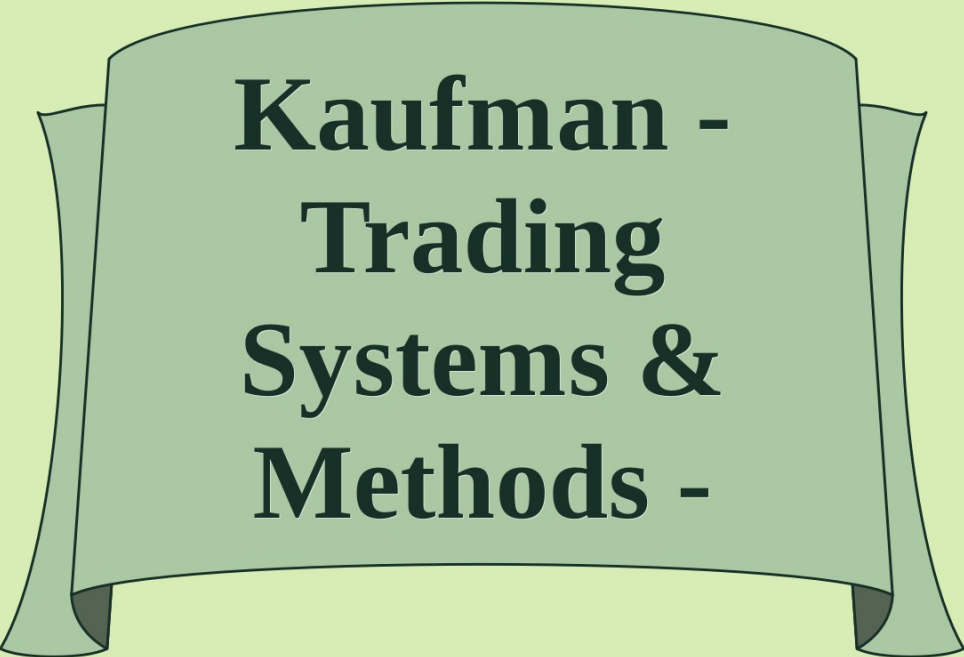




Kaufman - Trading Systems & Methods -

Chap01

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Introduction

Quantitative methods for evaluating price movement and making trading decisions have become a dominant part of market analysis. At one time, the only acceptable manner of trading was by understanding the factors that make prices move, and determining the extent or potential of future movement. The market now supports dozens of major funds and managed programs, which account for a sizable part of futures market open interest and operate primarily by decisions based on "technical analysis." selection, which can require sorting through thousands of individual world equities each day, has become a problem in data reduction finding specific patterns that offer the best expectations of profit. Many commercial participants in the markets, who once restricted research to supply and demand, or institutions once only interested in earnings and debt, now include various technical methods for the purpose of timing or confirming price direction.

In many ways, there is no conflict between fundamental and technical analysis. The decisions that result from economic or policy changes are farreaching: these actions may cause a longterm change in the direction of prices and may not be reflected immediately. Actions based on longterm forecasts may involve considerable risk and often can be an ineffective way to manage a position. Integrated with a technical method of known risk, which determines price trends over shorter intervals, investors at all levels have gained practical solutions to their trading problems.

Leverage in the futures markets has a strong influence on the methods of trading. With margin deposits ranging from 5 to 10% of the contract value (the balance does not have to be borrowed as in stocks), a small movement in the underlying price can result in large profits and losses based on the invested margin. Because high leverage is available, it is nearly always used. Methods of analysis will therefore concentrate on short-term price fluctuations and trends, in which the profit potential is reduced, so that the risk is often smaller than the required margin. Futures market systems can be characterized as emphasizing price moves of less than 20% of the contract value. Trading requires conservation of capital, and the management of investment risk becomes essential.

Even with the distinction forced by high leverage, many of the basic systems covered in this book were first used in the stock market. Compared with securities, the relatively small number of futures markets offer great diversification and liquidity. The relative lack of liquidity in a single stock lends itself to index analysis, whereas the commodity index, now tradeable as the CRB index, has never become very popular.

TECHNICAL VERSUS FUNDAMENTAL

Two basic approaches to trading futures are the same as in trading equities: fundamental and technical analysis. In futures, a fundamental study may be a composite of supply and demand elements: statistical reports on production, expected use, political ramifications, labor influences, price support programs, industrial development everything that makes prices

what they are. The result of a fundamental analysis is a price forecast, a prediction of where prices will be at some time in the future.

2

Technical analysis is a study of patterns and movement. Its elements are normally limited to price, volume, and open interest. It is considered to be the study of the market itself. The results of technical analysis may be a short or longterm forecast based on recurring patterns; however, technical methods often limit their goals to the statement that today's prices are moving up or down. Some systems will go as far as saying the direction is indeterminate.

Due to the rapid growth of computers, technical systems now use tools previously reserved for fundamental analysis. Regression and cycle (seasonal) analysis are built into most spreadsheet programs and allow these more complex studies, which were once reserved for serious fundamental analysts, to be performed by everyone. Because they are computerized, many technicians now consider them in their own domain. There will always be purists on either side, rigid fundamentalists and technicians, but a great number of professionals combine the two techniques. This book draws on some of the more popular, automated fundamental trading approaches.

One advantage of technical analysis is that it is completely selfcontained. The accuracy of the data is certain. One of the first great advocates of price analysis, Charles Dow, said:

The market reflects all the jobber knows about the condition of the textile trade;
all the banker knows about the money market; all that the bestinformed president knows of his own business, together with his knowledge of all other businesses; it sees the general condition of transportation in a way that the president of no single railroad can ever see; it is better informed on crops than the farmer or even the Department of Agriculture. In fact, the market reduces to a bloodless verdict all knowledge bearing on finance both domestic and foreign.

Much of the price movement reflected in commodity cash and futures markets is anticipatory; the expectations of the effects of economic developments. It is subject to change without notice. For example, a hurricane bound for the Philippines will send sugar prices higher, but if the storm turns off course, prices will drop back to prior levels. Major scheduled crop reports cause a multitude of professional guessing, which may correctly or incorrectly move prices just before the actual report is released. By the time the public is ready to act, the news is already reflected in the price.

PROFESSIONAL AND AMATEUR

Beginning traders often find a system or technique that seems extremely simple and convenient to follow, one that they think has been

overlooked by the professionals. Sometimes they are right, but most often that method doesn't work. Reasons for not using a technique could be the inability to get a good execution, the risk/reward ratio, or the number of consecutive losses that occur. Speculation is a difficult business, not one to be taken casually. As Wyckoff said, "Most men make money in their own business and lose it in some other fellow's."

To compete with a professional speculator, you must be more accurate in anticipating the next move or in predicting prices from current news than the article printed in today's newspaper ("Government Buys Beef for School Lunch Program"), which was discounted weeks ago, and not the one on the wire service ("15% Fewer Soybeans and 10% More Fishmeal") which went into the market two days ago. You must act on news that has not yet been printed. To anticipate changes, you must draw a single conclusion for the many contingencies possible from fundamental data, or

1. Recognize recurring patterns in price movement and determine the most likely results of such patterns.
2. Determine the trend of the market by isolating the basic direction of prices over a selected time interval.

3

The bar chart, discussed in Chapter 9 ("Charting"), is the simplest representation of the market. These patterns are the same as those recognized by Livermore on the ticker tape. Because they are interpretive, more precise methods such as point-and-figure charting are also used, which add a level of exactness to charting. Point-and-figure charts are popular because they offer specific trading rules and show formations similar to both bar charting and tickertape trading.

Mathematical modeling, using traditional regression or discrete analysis, has become a popular technique for anticipating price direction. Most modeling methods are modifications of developments in econometrics, basic probability; and statistical theory. They are precise because they are based entirely on numerical data.

The proper assessment of the price trend is critical to most commodity trading systems. Countertrend trading is just as dependent on knowing the trend as a trend-following technique. Large sections of this book are devoted to the various ways to isolate the trend, although it would be an injustice to leave the reader with the idea that a price trend is a universally accepted concept. There have been many studies published claiming that trends, with respect to price movement, do not exist. The most authoritative papers on this topic are collected in Cootner, *The Random Character of Stock Market Prices* (MIT Press) more recent and readable discussions can often be found in *The Financial Analysts Journal*, an excellent resource.

Personal financial management has gained an enormous number of tools during this period of computerized expansion. The major spreadsheet providers include linear regression and correlation analysis; there is inexpensive software to perform spectral analysis and apply advanced statistical techniques; and development software, such as TradeStation and MetaStock, have provided trading platforms and greatly reduced the effort

needed to program your ideas. The professional maintains the advantage of having all of their time to concentrate on the investment problems; however, the nonprofessional is no longer at a disadvantage because of the tools.

RANDOM WALK

It has been the position of many fundamental and economic analysis advocates that there is no sequential correlation between the direction of price movement from one day to the next. Their position is that prices will seek a level that will balance the supplydemand factors, but that this level will be reached in an unpredictable manner as prices move in an irregular response to the latest available information or news release.

If the random walk theory is correct, many welldefined trading methods based on mathematics and pattern recognition will fail. The problem is not a simple one, but one that should be resolved by each system developer, because it will influence the type of systematic approaches that will be studied. The strongest argument against the random movement supporters is one of price anticipation. One can argue academically that all participants (the market) know exactly where prices should move following the release of news. However practical or unlikely this is, it is not as important as market movement based on anticipation of further movement. For example, if the prime rate was raised twice in two months, would you expect it to be increased in the third month? Do you think that others will have mixed opinions, or that they assess the likelihood of another increase at different levels (i.e., one might see a 25% chance of an increase and another see a 60% chance). Unless the whole market view expectations the same way, then the price will move to reflect the majority opinion. As news alters that opinion the market will fluctuate. Is this random movement? No. Can this appear similar to random movement? Yes.

Excluding anticipation, the apparent random movement of prices depends on both the time interval and the frequency of data used. When a long time span is used, from 1 to

4

20 years, and the data averaged to increase the smoothing process, the trending characteristics will change, along with seasonal and cyclic variations. Technical methods, such as moving averages, are often used to isolate these price characteristics. The averaging of data into quarterly prices smooths out the irregular daily movements and results in noticeably positive correlations between successive prices. The use of daily data over a long time interval introduces noise and obscures uniform patterns.

In the long run, most futures prices find a level of equilibrium (with the exception of the stock index, which has had an upward bias) and, over some time period, show the characteristics of being mean reverting (returning to a local average price); however, shortterm price movement can be very different from a random series of numbers. It often contains two unique properties: exceptionally long runs of price in a single direction, and asymmetry, the unequal size of moves in different directions. These are the qualities that allow traders to profit. Although the longterm

trends that reflect economic policy, easily seen in the quarterly data, are not of great interest to futures traders, shortterm price movements caused by anticipation rather than actual events, extreme volatility, prices that are seen as far from value, countertrend systems that rely on mean reversion, and those that attempt to capture trends of less duration have been successful.

It is always worthwhile to understand the theoretical aspects of price movement, because it does paint a picture of the way prices move. Many traders have been challenged by trying to identify the difference between an actual daily price chart and one created by a random number generator. There are differences, but they will seem more subtle than you would expect. The ability to identify those differences is the same as finding a way to profit from actual price movements. A trading program seeks to find ways to operate within the theoretical framework, looking for exceptions, selecting a different time frame and capture profits and all without ignoring the fact that the theory accounts for most of the price movements.

BACKGROUND MATERIAL

The contents of this book assume an understanding of speculative markets, particularly the futures markets. Ideally the reader should have read one or more of the available trading guides, and understand the workings of a buy or sell order and the specifications of contracts. Experience in actual trading would be helpful. A professional trader, a broker, or a purchasing agent will already possess all the qualifications necessary. A farmer or rancher with some hedging experience will be well qualified to understand the risks involved. So is any investor who manages his or her own stock portfolio.

Literature on markets and trading systems has greatly expanded in the 11 years since the last edition of this book. During that time the most comprehensive and excellent work has been Jack Schwager's two volume set, *Schwager on Futures* (Wiley, 1995), which includes one volume on fundamental analysis and the other on technical analysis. John Murphey's *Technical Analysis of the Futures Markets* (New York Institute of Finance, 1986) and *Intermarket Technical Analysis* (Wiley, 1991) are highly recommended. Ralph Vince published a popular work, *Portfolio Management Formulas* (Wiley, 1990), and there is Peter L. Bernstein's *The Portable MBA in Investment* (Wiley, 1995), which again provides valuable background material in readable form. There have been quite a few books on specific systems and some on the development of computerized trading methods. The one comprehensive book of studies that stands out is *The Encyclopedia of Technical Market Indicators* by Robert W. Colby and Thomas A. Meyers (Dow Jones-Irwin, 1988), which offers an intelligent description of the calculation and trading performance of most market indicators oriented toward equities traders. Comparing the results of different indicators, side by side, can give you valuable insight into the practical differences in these techniques.

always been the Commodity Trading Manual (Chicago Board of Trade), but each year Futures magazine publishes a Reference Guide, which gives the current futures and options markets traded around the world. No doubt, all of this information will be available through Internet. For beginning or reviewing the basics, there is Todd Lofton's *Getting Started in Futures* (Wiley, 1989); Little and Rhodes, *Understanding Wall Street*, Third Edition (McGrawHill, 1991); and *The Stock Market*, 6th Edition by Teweles, Bradley, and Teweles (Wiley, 1992). The introductory material is not repeated here.

A good understanding of the most popular charting method requires reading the classic by Edwards and Magee, *Technical Analysis of Stock Trends* (John Magee), a comprehensive study of bar charting. Writings on other technical methods are more difficult to find. The magazine *Technical Analysis of stocks & Commodities* stands out as the best source of regular information; Futures magazine has fewer technical articles, but many of value and many other commodity books express only a specific technical approach. Current analysis of many market phenomena and relationships can be found in *The Financial Analysts journal*.

On general market lore, and to provide motivation when trading is not going as well as expected, the one book that stands out is Lefevre's *Reminiscences of a Stock Operator* (originally published by Doran, reprinted by Wiley in 1994). Wyckoff mixes humor and philosophy in most of his books, but *Wall Street Ventures and Adventures Through Forty Years* (Harper & Brothers) may be of general interest. More recently, Jack Schwager's *Market Wizards* (New York Institute of Finance, 1989) has been very popular.

A reader with a good background in high school mathematics can follow most of this book, except in its more complex parts. An elementary course in statistics is ideal, but a knowledge of the type of probability found in Thorp's *Beat the Dealer* (Vintage) is adequate. Fortunately, computer spreadsheet programs, such as Excel and Quattro, allow anyone to use statistical techniques immediately, and most of the formulas in this book are presented in such a way that they can be easily adapted to spreadsheets. Having a computer with trading software (such as Omega's SuperCharts, MetaStock, or any number of products), or having a data feed (such as Telerate or CQG), which offers technical studies, you are well equipped to continue.

RESEARCH SKILLS

Before starting, a few guidelines may help make the task easier. They have been set down to help those who will use this book to develop a trading system.

Know what you want to do. Base your trading on a solid theory or observation, and keep it in focus throughout development and testing. This is called the underlying premise of your program.

State your hypothesis or question in its simplest form. The more complex it is, the more difficult it will be to evaluate the answer.

3. Do not assume anything. Many projects fail on basic assumptions that were incorrect.
 4. Do the simplest things first. Do not combine systems before each element of each system is proven to work independently.
 5. Build one step at a time. Go on to the next step only after the previous ones have been tested successfully. If you start with too many complex steps and fail, you will have to simplify to find out what went wrong.
 6. Be careful of errors of omission. The most difficult part of research is identifying the components to be selected and tested. Simply because all the questions asked were satisfactorily answered does not mean that all the right questions were asked. The most important may be missing.
- 6
7. Do not take shortcuts It is sometimes convenient to use the work of others to speed up the research. Check their work carefully; do not use it if it cannot be verified. Check your spreadsheet calculations manually. Remember that your answer is only as good as its weakest point.
 8. Start at the end Define your goal and work backward to find the required input. In this manner, you only work with information relevant to the results otherwise, you might spend a great deal of time on irrelevant items.

OBJECTIVES OF THIS BOOK

This book is intended to give you a complete understanding of the tools and techniques needed to develop or choose a trading program that has a good chance of being successful. Execution skill and market psychology are not considered, but only the development of a system that has been carefully thought out and tested. This itself is an achievement of no small magnitude.

Not everything can be covered in a single book; therefore, some guidelines were needed to control the material included here. Most important are techniques that are common to most markets, such as trend and countertrend techniques, indicators, and testing methods. Popular analytic techniques, such as charting, are only covered to the degree that various patterns can be used in a computerized program to help identify support and resistance, channels, and so forth. There has been no attempt to provide a comprehensive text on charting. Various formations may offer very realistic profit objectives or provide reliable entry filters, even though they are not included.

Some popular areas, such as options, are not covered at all. There are many good books on options strategies, and to include them here would be a duplication of effort. Also, those strategies that use statistics, such as price/earnings ratios, specific to equities, have not been included, although indicators that use volume, even the number of advancing and declining issues, you will find in the section on volume because they fit into a bigger picture. This remains a book on trading futures markets, yet it recognizes

that many methods can be used elsewhere.

This book will not attempt to prove that one system is better than another, because it is not possible to know what will happen in the future. It will try to evaluate the conditions under which certain methods are likely to do better and situations that will be harmful to specific approaches. Most helpful should be the groupings of systems and techniques, which allow a comparison of features and possible results. Seeing how analysts have modified existing ideas can help you decide how to proceed, and why you might choose one path over another. By seeing a more complete picture, it is hoped that common sense will prevail, rather than computing power.

PROFILE OF A TRADING SYSTEM

There are quite a few steps to be considered when developing a trading program. Some of these are simply choices in style that must be made, while others are essential to the success of the results. They have been listed here and discussed briefly as items to bear in mind as you continue the process of creating a trading system.

Changing Markets and System Longevity

Markets are not static. They evolve because the world changes. Among those items that have changed during the past 10 years are the market participants, the tools used to watch the market, the tools used to develop trading models, the economies of countries such as Japan, the union of European countries, the globalization of markets, and the risk of participation. Under this changing situation, a trading system that works today might not work

7

far into the future. We must carefully consider how each feature of a trading program is affected by change and try to create a method that is as robust as possible to increase its longevity.

The Choice of Data

System decisions are limited by the data used in the analysis. Although price and volume for the specific market may be the definitive criteria, there is a multitude of other valid statistical information that might also be used. Some of this data is easily included, such as price data from related markets; other statistical data, including the U.S. economic reports and weekly energy inventories, may add a level of robustness to the results but are less convenient to obtain.

Diversification

Not all traders are interested in diversification, which tends to reduce returns at the same time that it limits risk. Concentrating all of your resources on a single market that you understand may produce a specialized approach and much better results than using a more general technique over more markets. Diversification may be gained by trading more than one method in addition to a broad set of markets, provided the programs are unique in style. Proper diversification reduces risk more than returns.

Time Frame

The time frame of the data impacts both the type of system and the nature of the results. Using 5-minute bars introduces considerable noise to your program, making it difficult to find the trend, while using only weekly

data puts so much emphasis on the trend such that your trading style is already determined. A shorter time may guarantee faster response to price changes, but it does not assure better results. Each technique must be applied properly to the right data and time frame.

Choosing a Method of Analysis

Some methods of analyzing the market are more complex than others. This in itself has no bearing on the final success. All good trading methods begin with a sound premise. You must first know what you are trying to extract from the market before you select a technique. If you want to capitalize on long interest rate trends or on the result of government policy, then a weekly moving average or trend system will be the place to start. If you see false breakouts whenever price penetrates the high of the day in the second half of the trading session, you'll want to look at a momentum indicator based on 5, 10, or 15 minute data. First the idea, then the tool.

Trade Selection

Although a trading system produces signals regularly, it is not necessary to enter all of them. Selecting one over another can be done by a method of filtering. This can vary from a confirmation by another technique or system, a limitation on the amount of risk that can be accepted on any one trade, the use of outside information, or the current volume. Many of these add a touch of reality to an automated process. You may find, however, that too many filters result in no trading.

Testing

There has been a lot of emphasis on testing, and there is a complete discussion in this book; however, testing is most important to confirm, or validate, your ideas. It fails when

8

you use broad tests to find successful techniques. The purpose of testing is to show robustness, that the method works over a wide range of situations in a similar manner. A robust solution will not appear to be as good as the optimal result, but performed properly, it will be a more realistic assessment of expectations.

Risk Control

Every system must control its risk, and most analysts believe that nearly any system can be profitable with proper risk management. This also means that any system can lead to ruin without risk controls. Risk can be managed from the trade level, with individual stoplosses, to asset allocation, by varying the size of the position traded, and by leveraging and deleveraging. Some form of management is necessary.

Order Entry

A system that performs well on paper may be dismal when actually traded. Part of a trading program is to know the method of entering and exiting the market and the cost of each trade. Style and cost will have a greater impact on shortterm systems, which have a smaller profit per trade and are, therefore, more sensitive to transaction costs. There is equal damage in overestimating costs as there is in underestimating them. By burdening a system with unrealistic fees, it may show a loss when it should

be a successful trading method.

Performance Monitoring and Feedback

A system is not done when you begin trading, it is only in a new phase. Actual trading results must be carefully monitored and compared with expectations to know if it is performing properly. It is very likely that slippage will result in some changes to the system rules or to the size of the position traded. Performance monitoring provides the essential feedback needed to be successful. Even a well thoughtout and tested program may start out badly, but proper monitoring can put it on track.

A WORD ON NOTATION USED IN THIS BOOK

In attempting to make the contents of this book more practical for many readers, there are three types of notation that can be found mixed together. Of course, the standard mathematical formulas for most methods appear as they had in the previous editions. Added to that are spreadsheet examples, using Corel's Quattro code, which is very similar to Microsoft's Excel. Readers should have no trouble transferring the examples found here to their own choice of spreadsheet.

Finally there is extensive program code with examples in Omega's Easy Language. Although these programs have been entered and tested on TradeStation, there are occasional errors introduced during final editing and in transferring the code into this book. Readers are advised to check over the code and test it thoroughly before using it. In addition, there are times when only a single line of code is shown along with the standard mathematical formula to help the reader translate the technique into a more practical form. Because of the many different forms of formulas, you may find that the standard deviation function takes the spreadsheet form of @std rather than the Easy Language notation @stddev, or that @avg appears instead of @average. Please check these formulas for notation consistent with your needs.